■SYSTEM OPERATION

1. General

The electronic control of the push button start system has following control.

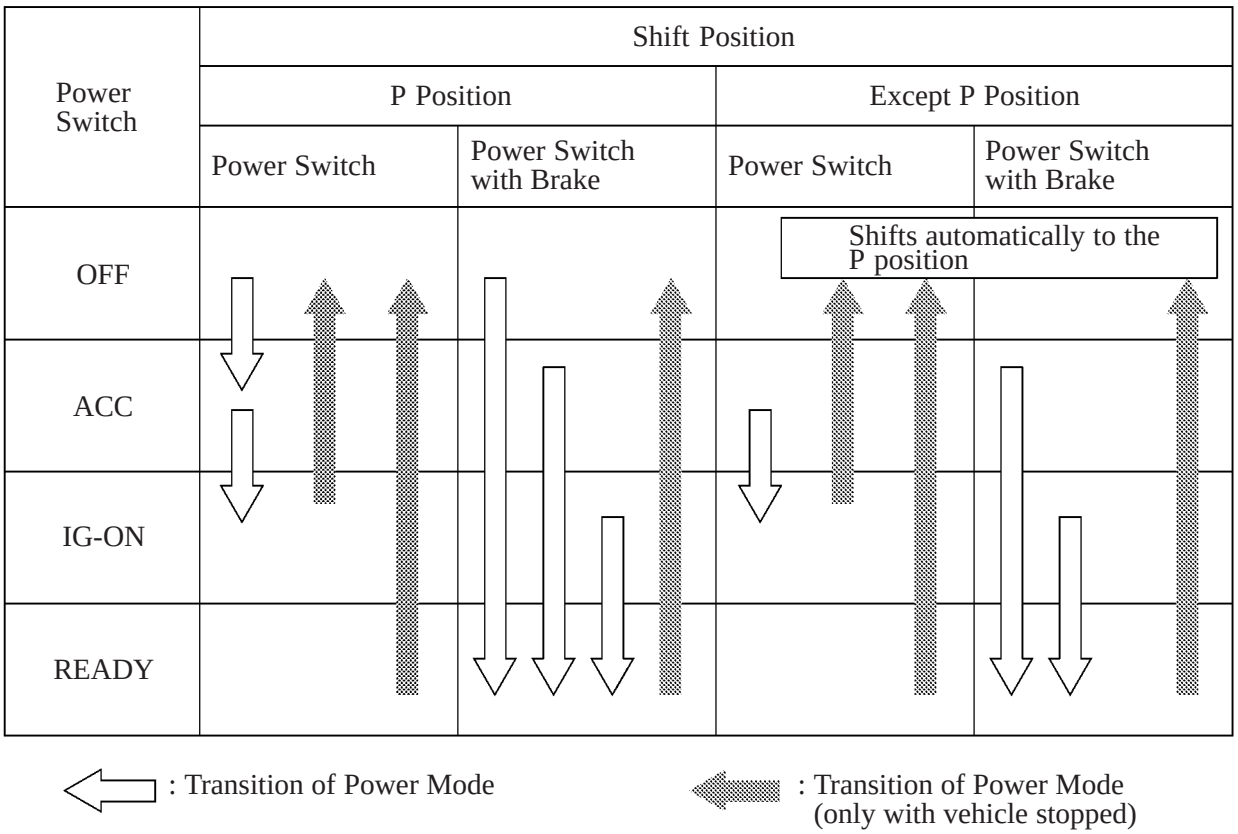
Control	Outline
Power Switch Control (with Key)	The transponder key ECU checks the ID code when a key is inserted in the key slot. The power source control ECU verifies the check results and authorizes the operation of the switch.
Power Switch Control (with Smart Key)	• If the driver operates the power switch with a key in his/her possession, the power source control ECU starts the room oscillator, which transmits a request signal to the key. Upon receiving this signal, the key transmits an ID code signal to the smart ECU. • The transponder key ECU verifies the check results received from the smart ECU via the BEAN and sends them to the power source control ECU. Based on these results, the power source control ECU authorizes the operation of the power switch. • For details on the power switch control with smart key, see page BE-37.
Auto P Control	If the power switch is turned OFF when the shift position is other than P, the transmission control ECU activates the shift control actuator on a command from the HV ECU in order to change the shift position to the P position.
Diagnosis	When the power source control ECU detects a malfunction, the power source control ECU diagnoses and memorizes the failed section.

2. Power Switch Control (with Key)

General

- When a key is inserted in the key slot and the transponder key ECU recognizes the ID code of the key, the power source control ECU authorizes the operation of the power switch. As a result, the power changes to the mode selected at the power switch.
- The power modes change in three stages (OFF → ACC → IG-ON → OFF) each time the power switch is pressed. If the driver presses on the power switch while pressing on the brake pedal (which causes the stoplight switch to turn ON), the power mode will change to READY regardless of the previous power mode.
- After approximately 1 hour elapses with the power switch at ACC and the shift lever in the P position, the power source control ECU will automatically turn OFF the power.
- The table below shows the transition of the power modes.

▶ Transition of Power Mode ◀

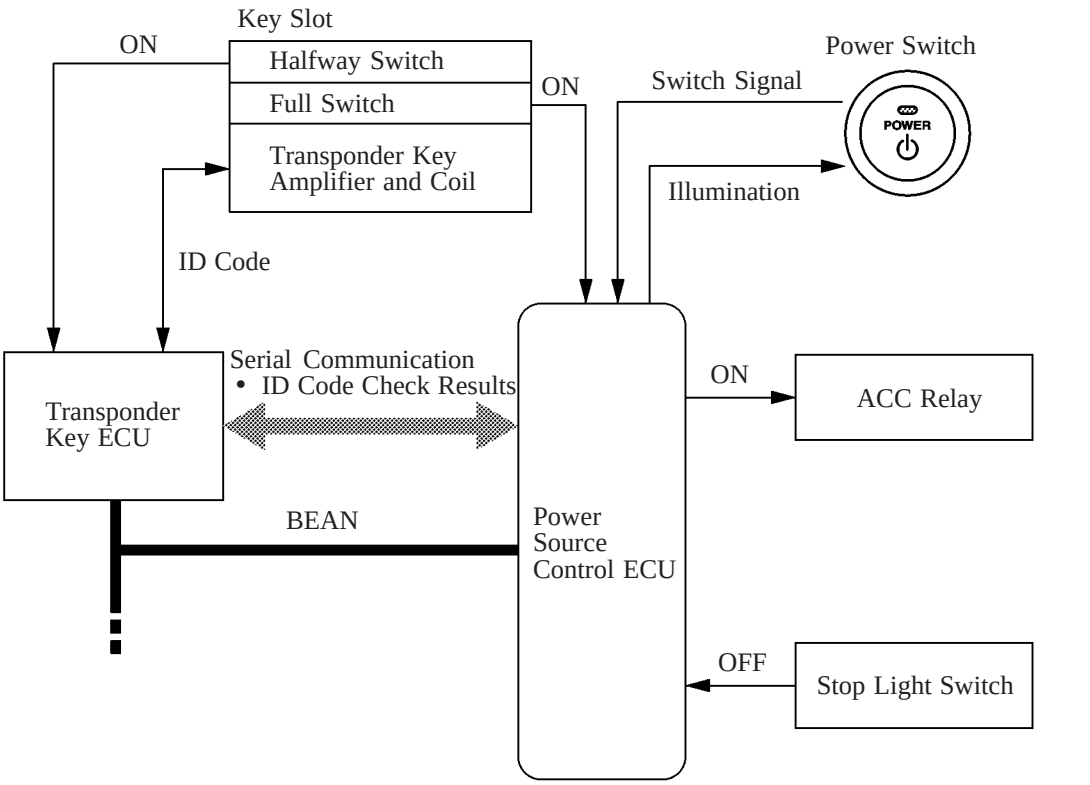


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NOTE: Normally, the operation of the power switch is disabled while the vehicle is being driven. However, if the hybrid system must be stopped in an emergency while the vehicle is in motion, the driver can press the power switch for approximately 3 seconds or more to stop the hybrid system. (The power switch changes from READY → ACC).

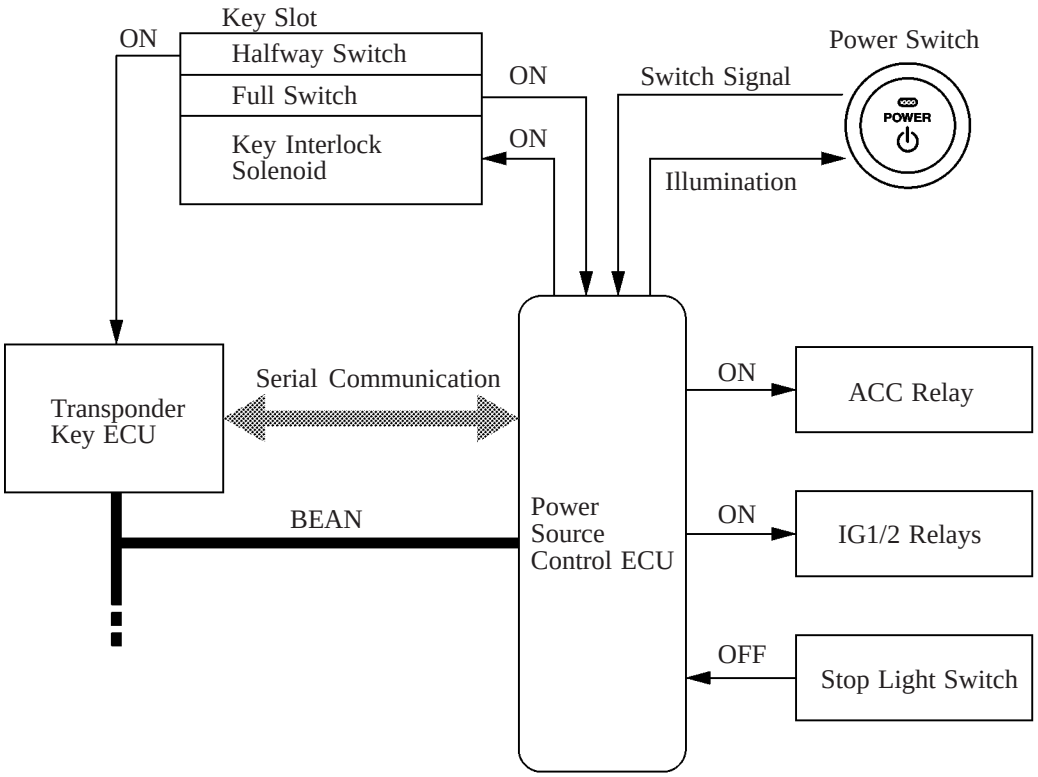
OFF→ACC

- When the driver inserts a key in the key slot, the transponder key ECU checks the ID code of the key.
- In this state, if the driver presses the power switch once without pressing the brake pedal, the power source control ECU verifies the check results of the key ID code provided by the transponder key ECU.
- When the check results reveal that the ID code is legitimate, the power source control ECU turns ON the ACC relay and starts the ACC power supply.
- At this time, the power source control ECU illuminates a green indicator light on the power switch in order to inform the driver of the ACC power mode.



ACC→IG-ON

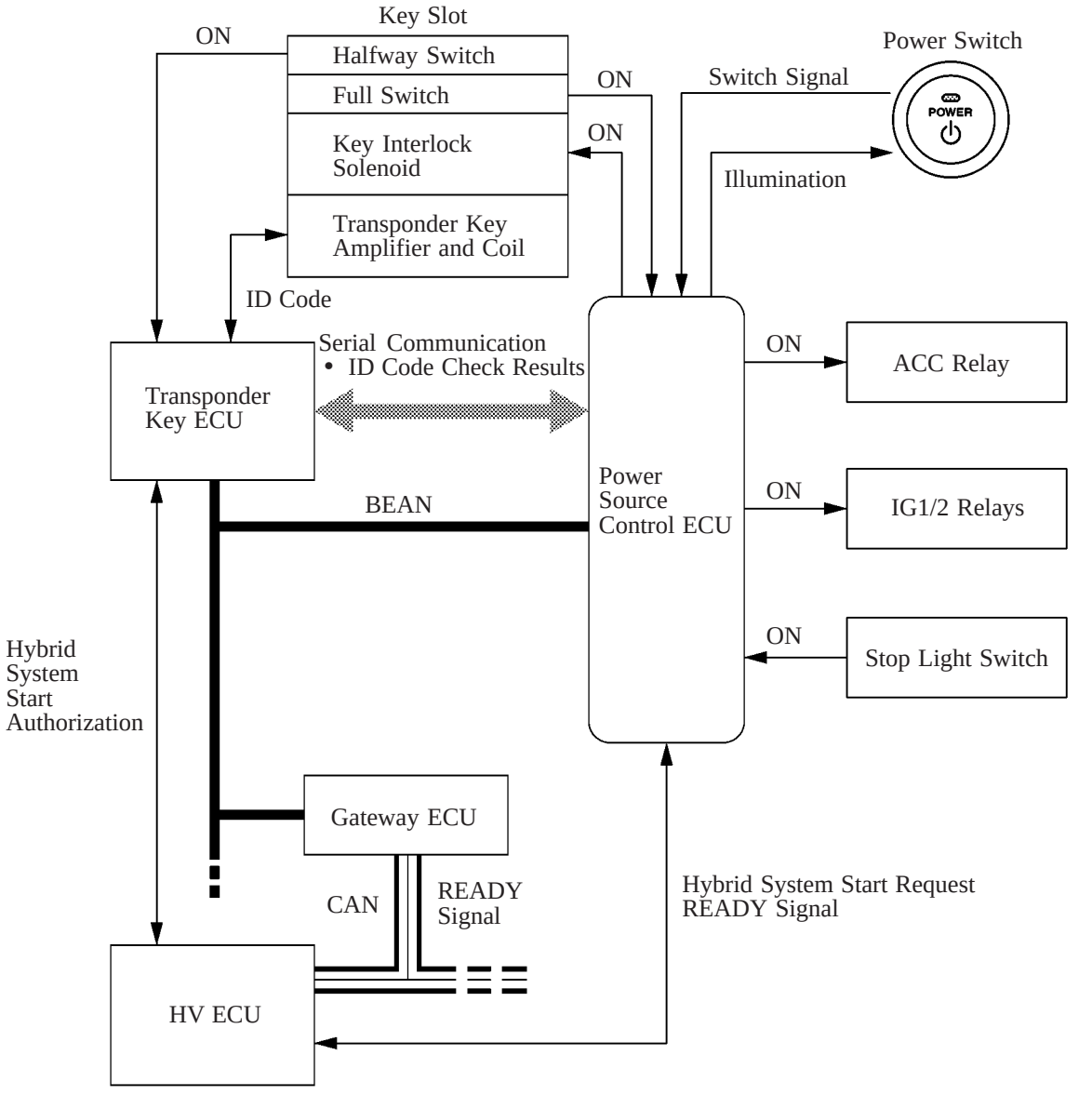
- When the power switch is at ACC and the driver presses the power switch once without pressing the brake pedal, the power source control ECU will turn ON the IG1 and IG2 relays in order to start the supply of IG power. At this time, the ACC relay remains ON.
- At this time, the power source control ECU will illuminate an amber indicator light on the power switch in order to inform the driver of the IG-ON mode.



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OFF→READY

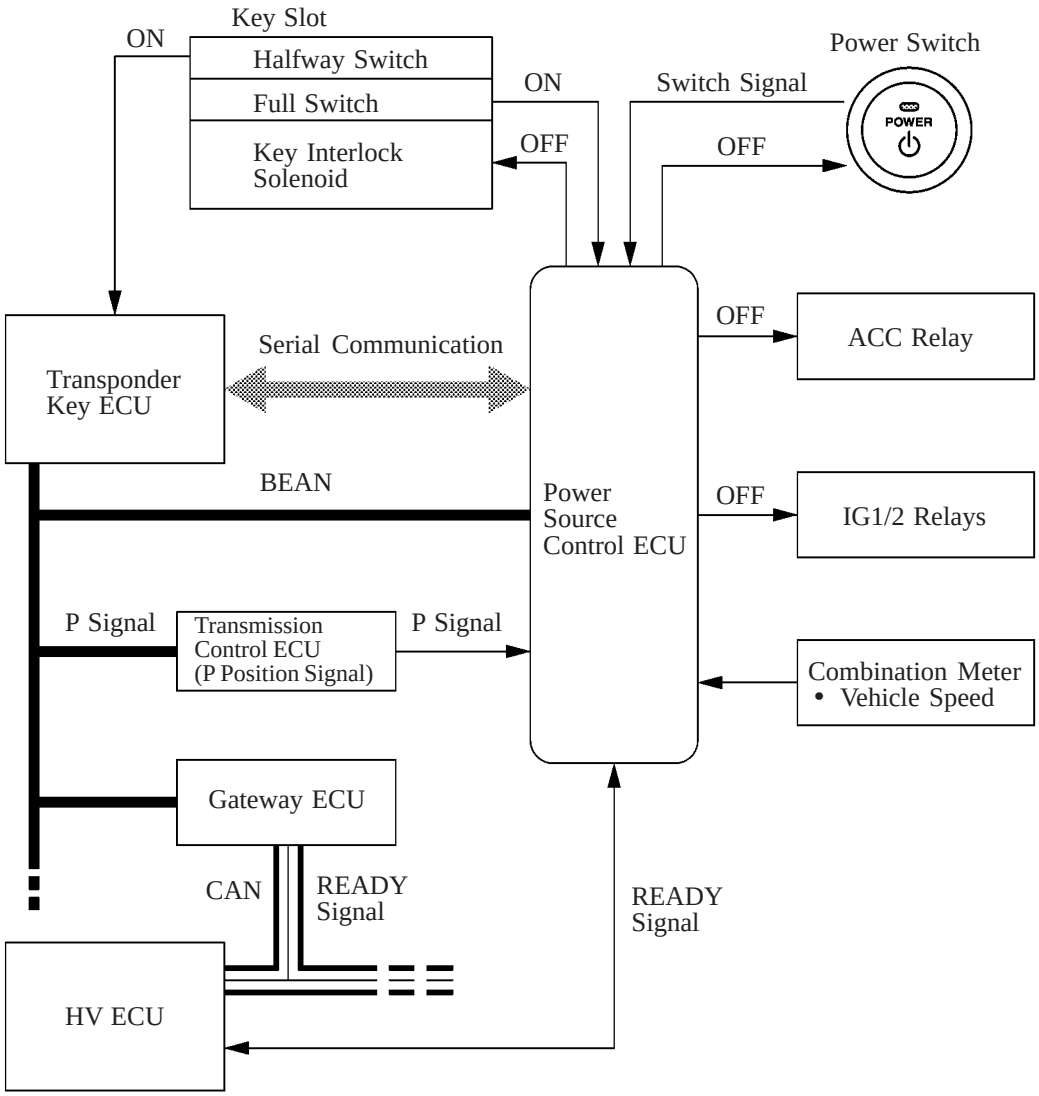
- The transponder key ECU checks the ID code of the key when a key is inserted in the key slot.
- In this state, if the driver presses the power switch once while pressing the brake pedal, the power source control ECU verifies the key ID code check results provided by the transponder key ECU.
- When the check results reveal that the ID code is legitimate, the power source control ECU turns ON the IG1 and IG2 relays in order to start the supply of IG power.
- At this time, the power source control ECU will illuminate an amber indicator light on the power switch in order to inform the driver of the IG-ON mode.
- After illuminating the indicator light, the power source control ECU will transmit a hybrid system start instruction signal to the HV ECU.
- Upon receiving this signal, the HV ECU verifies the key ID code check results provided by the transponder key ECU.
- When the check results reveal that the ID code is legitimate, the HV ECU starts the hybrid system.
- At this time, the power source control ECU will turn OFF the indicator light on the power switch, in order to inform the driver of the READY mode.



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READY or IG-ON→ OFF

- If the driver presses power switch (while the vehicle is stopped and the shift position is in the P position) in order to change the power mode from READY or IG-ON to OFF, the power source control ECU will check with the transmission control ECU, via BEAN, whether the shift position is in the P position.
- Accordingly, if the power source control ECU determines that the shift position is in the P position, it will turn the ACC, IG1, and IG2 relays OFF, in order to stop the power supply.
- When the power mode changes from IG-ON to OFF, the power source control ECU turns OFF the indicator light on the power switch in order to inform the driver of the OFF mode.

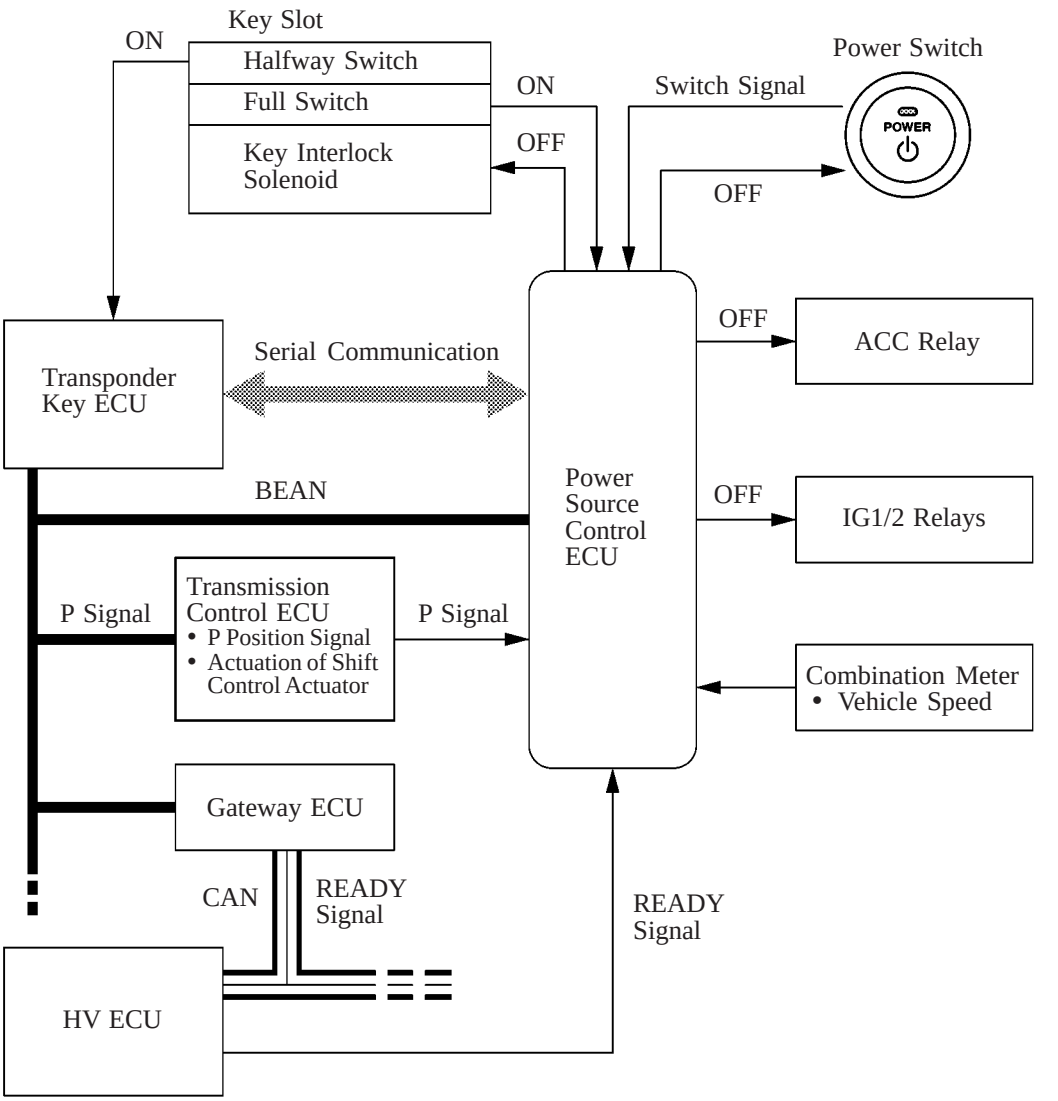


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3. Auto P Control

- If the driver presses power switch (while the vehicle is stopped and the shift position is in a position other than the P position) in order to change the power mode from READY or IG-ON to OFF, the power source control ECU will check with the transmission control ECU, via BEAN, whether the shift position is in the P position.
- Accordingly, if the power source control ECU determines that the shift position is in other than the P position, the power source ECU transmits the vehicle power supply OFF signal to the HV ECU via the transmission control ECU.
- On the signal from the power source control ECU, the HV ECU transmits the shift control actuator operate command signal to the transmission control ECU. The transmission control ECU then activates the shift control actuator in order to change the shift position to the P position.
- After the shift position has been changed to the P position, the power source control ECU will turn the ACC, IG1, and IG2 relays OFF, in order to stop the power supply.
- When the power mode changes from IG-ON to OFF, the power source control ECU turns OFF the indicator light on the power switch in order to inform the driver of the OFF mode.



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4. Diagnosis

- If a malfunction occurs in the IG circuit, the power source control ECU will effect the controls listed in the table below and record a DTC (Diagnostic Trouble Code).

IG Circuit Malfunction	Detail
Malfunction occurring during IG-ON mode	• The hold circuit in the power source control ECU continues to supply power to the IG1 and IG2 relays. At this time, the power source control ECU will blink an amber indicator light on the power switch. • When the hybrid system is stopped (IG-ON → OFF), the power source control ECU will continue blinking the indicator light on the power switch for 15 seconds after the power switch has been turned OFF, and then it will turn OFF the indicator light. • The hybrid system cannot be restarted.
Malfunction occurring during ACC or OFF mode	• A malfunction can be detected, when the power mode changes to IG-ON by pressing the power switch (the power mode changes to OFF). • The power source control ECU will blink an amber indicator light on the power switch. (The light will continue to blink for 15 seconds after the power switch has been turned OFF, and then it will turn OFF.) • The hybrid system cannot be restarted.

- The DTC can be accessed the use of the intelligent tester II. For details, see the Prius Repair Manual (Pub. No. RM1076E).
- The table below indicates the DTC that are associated with this system.

DTC No.	Detection Item	DTC No.	Detection Item
B2271	Ignition Hold Monitor Malfunction	B2281	P Signal Malfunction (Cable-information does not match to BEAN-Information)
B2272	Ignition 1 Monitor Malfunction	B2282	Vehicle Speed Signal Malfunction (Cable-information does not match to BEAN-Information)
B2273	Ignition 2 Monitor Malfunction	B2284	Brake Signal Malfunction (Cable-information does not match to BEAN-Information)
B2274	ACC Monitor Malfunction	B2286	READY Signal Malfunction
B2275	STSW Monitor Malfunction	B2287	LIN Communication Master Malfunction
B2277	Detecting Vehicle Submersion	B2289	Key Collation Waiting Time Over
B2278	Main Switch (power switch) Malfunction (Starter switch 1 signal does not match to starter switch 2 signal)	—	—